

High Temperature Solid State Lithium Battery, Phase I

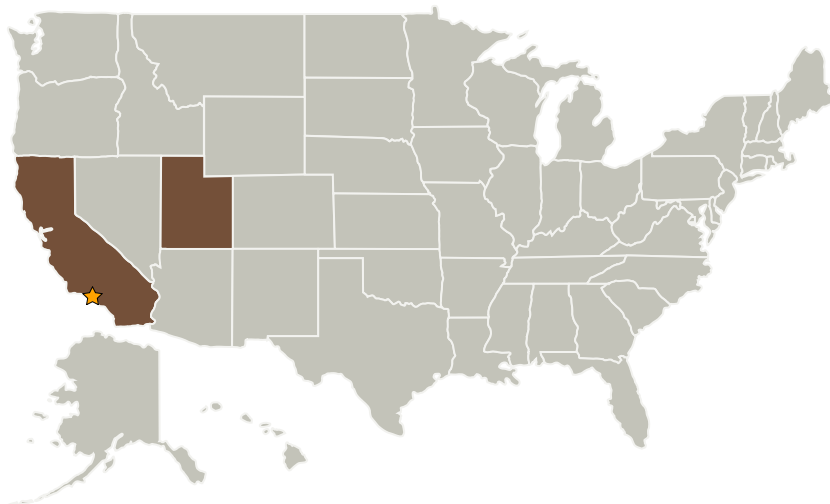
Completed Technology Project (2004 - 2004)



Project Introduction

Reliable energy systems with high energy density capable of operating at high temperatures, pressures and radiation levels are needed for certain NASA missions. Batteries based on solid-state ceramic oxide composite electrolytes provide the benefit of operation at temperatures up to 550o C. The current high-temperature Li battery technologies use carbonate, chloride and other molten compounds based electrolytes within porous separators. The operating temperatures of these systems are limited to below 450o C due to reactivity of these electrolytes with electrode materials and issues associated with sealing and packaging such batteries systems. Solid state electrolyte based batteries can be packaged to be leak proof under extreme conditions as there are no liquid components involved. Ceramtec Inc. is proposing to develop LiAl-solid electrolyte-FeS₂ battery system based on co-pressed and laminated electrode-electrolyte structures. The Li ion conductivity of the solid electrolytes developed at Ceramtec approaches 10-1 S/cm at 400o C, and are chemically compatible with the selected electrode materials. These batteries can be developed as either primary or secondary battery systems for use at temperatures above 400o C. In our Phase I SBIR program, single cells will be fabricated and their specific energy, cyclability and rate capability will be evaluated.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Ceramatec, Inc.	Supporting Organization	Industry	Salt Lake City, Utah

Primary U.S. Work Locations

California	Utah
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Sai Bhavaraju

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.2 Energy Storage
 - └ TX03.2.1 Electrochemical: Batteries